



Wet Research Project

Design and Maintenance of Subsurface Gravel Wetlands

The New Hampshire Department of Transportation (NHDOT) uses subsurface gravel wetlands (SGW) to treat runoff from highway applications and has implemented the systems at various locations across the state. The University of New Hampshire Stormwater Center (UNHSC) conducted a design and maintenance review of subsurface gravel wetland systems for the Department. The study included evaluation of NHDOT site and construction plans, construction photo documentation, cost and material specification sheets, and the NHDOT SGW design specification dated December 20, 2013. They also inspected subsurface gravel wetland systems that were designed and installed on NHDOT projects in order to determine maintenance needs. The UNHSC report is a resource for SGW designers and installers to assist in the design, cost and material specification, and maintenance requirements to ensure a properly functioning SGW system.

This research project identified substantial savings potential while still maintaining an appropriate degree of improvement to stormwater quality. The current average cost to construct a SGW is approximately \$32,500 per impervious acre of land use treated by the system. Results of the cost assessment indicates potential construction savings greater than \$5,000 per contributing impervious acre.



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SHRP2 Implementation Assistance Program (IAP)

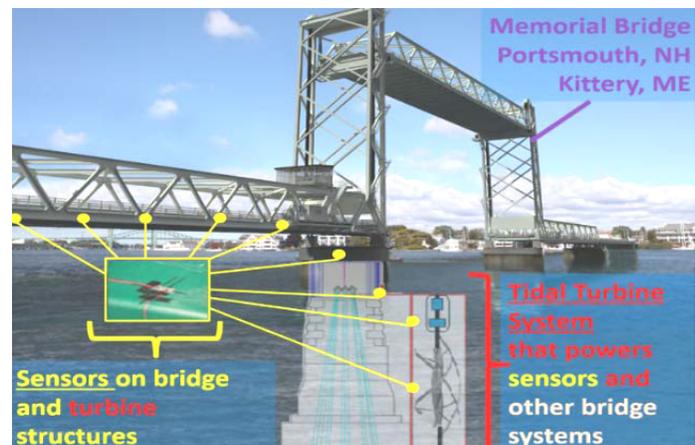
(R15B) Identifying and Managing Utility Conflicts - Improving cooperation among highway agencies and utilities for faster project delivery. The Round 3 Lead Adopter IAP award is \$150,000 including training on using the UCM excel and access databases, how to incorporate UCM in their existing business processes, and assistance for tweaking current business processes with your agency to accommodate the use of the matrix throughout the design process.

(R10) Project Management Strategies for Complex Projects - A more comprehensive, innovative approach to managing complex projects. The Round 4 User Incentive IAP award includes eight hours of technical assistance and \$30,000 in funding to perform other activities identified by the Department.

Accelerated Innovative Deployment (AID)

Living Bridge—Memorial Bridge Portsmouth, NH to Kittery, ME

Using strategic placement of sensors, this project will provide the means for diagnosing and automatic condition reporting. Approximately 30 sensors will be used to assess the effectiveness of several structural innovations. In addition, a research demonstration project is proposed to attach a tidal turbine to a bridge pier. The turbine will generate power for the system of sensors. For additional information see <http://smartbuildings.unh.edu/>



Asphalt Rubber Bonded Wearing Course

The new pavement overlay will be placed on a section of I-293 in Manchester is unique because one ingredient is recycled rubber tires. Asphalt rubber bonded wearing course (AR BWC) is an innovative pavement preservation technique to address surface defects in existing roadways.

There are three main differences between a traditional Hot Mix Asphalt (HMA) overlay and AR BWC

- Ground rubber tires are added to the HMA to give it extra flexibility
- The AR BWC placed is between 1/2" and 3/4" thick while an HMA overlay is usually at least twice that thickness
- In a single pass, a warm polymer-modified asphalt emulsion is applied over the existing asphalt immediately before the AR BWC layer

AR BWC provides an improved roadway surface that fills small cracks in the underlying pavement structure. Additional benefits include: shorter construction schedule, enhanced performance and service life, reduced water spray from road vehicles in wet conditions, and noise level reduction.

New England Transportation Consortium (NETC)

14-1 Measuring the Effectiveness of Competency Models for Job-Specific Professional Development of Engineers & Engineering Technicians

Project objectives: Identify and review existing Competency Models (CM) and matrices that can help in the development of a DOT specific competency model; to perform a gap analysis on the existing CM's and matrices to create a DOT specific employee competency matrix; determine the financial benefits (return on investment) of having a CM in place; create an implementation plan and technology transfer strategy

14-2 Investigation of Northern Long-Eared Bat (NLEB) Roosting Sites on Bridges

The research project proposes to develop an accurate screening tool for determining the presence of NLEB roosting in New England bridges. Additional information will be collected and disseminated related to preferred structural types for bat roosting, New England bat population distributions, and evaluation of existing public data already collected by State Fish and Wildlife Departments and Transportation Agencies throughout New England.

14-4 Optimizing future work zones in New England for safety

This project will develop detailed plans on optimal layouts and speed policies for future work zones in New England based on minimizing the crash risk and maintaining a reasonable flow of traffic. This project will examine how current and developing technology (e.g. variable message signs) can be used to provide safer, more efficient traffic through work zones. The project will use systems engineering methods that are capable of modeling drivers' behavior and the physics of motion,

15-1 Use of Forested Habitat Adjacent to Highways by Northern Long Ear Bats

The project would develop a matrix of changes caused by roadway construction (sound frequencies and volumes, canopy width, etc.) and an assessment of the compatibility / interference on the behavior of Northern Long-Eared Bat colonies and other potential listed species. It will also result in a screening tool that would show zones of influence around highways (noise and disturbance levels) and how likely bats would be to use adjacent habitats. The tool would link with GIS and other geocoded information, databases, and satellite imagery (Google Earth).

15-2 Using the New SHRP2 Naturalistic Driving Study Safety Database to Examine Safety Concerns for Teens and Older Drivers

This project would use the New SHRP2 Naturalistic Driving Study Safety Database to examine patterns of behavior associated with teen and older drivers and how they affect safety. In addition, the project would evaluate the new SHRP2 Roadway Information Database to determine if there are any correlations between roadway design and teen/older driver safety.

15-3 Moisture Susceptibility Testing for Hot Mix Asphalt Pavements in New England

This project will investigate the extent of HMA pavement damage due to moisture in New England and develop recommendations for test procedures that correlate well with actual field performance.

15-4 Optimizing Quality Assurance (QA) Process for Asphalt Pavement Construction in the Northeast

The project is intended to develop a detailed document listing differences between asphalt QA processes of member states using interviews and then conducting a risk and cost assessment of the processes to propose best practices. The evaluation would result in a regional white paper describing best asphalt QA practices for NETC constituents

Structural Condition Assessment of Reinforced Base Course

The Cold Regions Research and Engineering Laboratory (CRREL) is examining the economic viability of the reinforced pavement application for NHDOT in comparison to conventional pavement sections. Potential benefits include reducing excavation of subgrade materials, reduced pavement structure thicknesses, and reduced maintenance. The final report will include results from:

- Falling Weight Deflectometer (FWD) testing on the reinforced base course and the adjacent conventional pavement sections in three seasons:
 - Summer—a normal condition
 - Fall—after a rain event
 - Spring—under thawing condition
- Back-calculation and analysis of FWD data to quantify the layer moduli values
- Summarizing the layer moduli values and relating to design.



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*“Research is
creating new
knowledge.”*

Neil Armstrong

New Hampshire
DOT
Department of Transportation

Qualified Product List (QPL) Update

The QPL is a companion document to the Department’s “Standard Specifications for Road and Bridge Construction” (specifications). The QPL provides a listing of products that have been pre-qualified as being able to meet the requirements of specific sections of the specifications and associated supplemental specifications or special provisions as noted on the QPL. The 2015 update is now available.

<http://www.nh.gov/dot/org/projectdevelopment/materials/research/documents/qpl.pdf>

Personnel Changes

NHDOT Research Engineer

Ms. Ann Scholz is a licensed professional engineer and has over 20 years of experience employed as a Civil Engineering consultant. Her consulting experience as a project engineer included design of major roadway and utility infrastructure, hydrologic and hydraulic analysis for bridge replacements and floodplain encroachments, development of industrial, commercial and mixed use sites. She had been the Assistant Research Engineer with the NHDOT Bureau of Materials and Research since October 2012 and was selected to oversee Research in March 2015.



NHDOT Assistant Research Engineer

Ms. Beth Klemann is a licensed professional engineer and has 25 years of experience in highway design, hydrologic analysis, and NEPA evaluations. A recent transplant from Wisconsin she worked for the State of Wisconsin (Department of Natural Resources and Department of Transportation) for 11 years before spending almost 14 years as a consultant. She started with the NHDOT Bureau of Materials and Research in June 2015.



Mr. Glenn Roberts served as the Research Section Chief and oversaw the Research Program for 22 years. In December he was selected to lead the Department’s Geotechnical Section, where he spent the first five years of his NHDOT career.

“Alan (former M&R Administrator Rawson) used to tell me that my position in Research was the best job in the Department and I think in many ways he was right. It was satisfying to be a part of numerous research initiatives and innovations at the state, regional and national level, but I am looking forward to new challenges. I know that the NHDOT Research Program has been left in very capable hands.”

WHAT’S YOUR PROBLEM?